

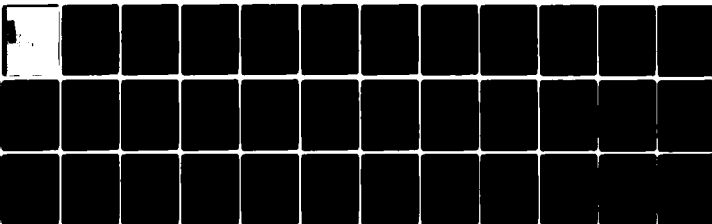
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A KEY TO THE FISHES OF MISSISSIPPI SOUND AND ADJACENT WATERS, (U)  
1974 J W CLIBURN

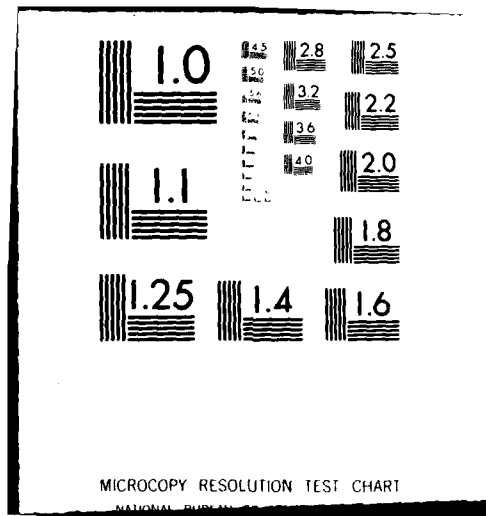
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**GULF COAST RESEARCH LABORATORY**  
Ocean Springs, Mississippi

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**A KEY TO THE FISHES OF MISSISSIPPI SOUND AND ADJACENT WATERS**

*compiled and edited  
by*

**J. WILLIAM CLIBURN**  
Professor of Biology  
University of Southern Mississippi  
and  
Gulf Coast Research Laboratory

## FOREWORD

It is intended that this key will be useful in identifying the species of fishes normally occurring in Mississippi Sound. In addition, certain species commonly landed at Mississippi ports, but not found within the Sound, are included. No attempt is made to include fishes commonly occurring in fresh waters but often taken in brackish waters of Mississippi Sound, as these fishes are adequately keyed elsewhere (Eddy 1969).

Certain species which occur within the limits of Mississippi Sound may be inadvertently omitted. Some occasional stragglers into the area are included, although they may be taken only rarely.

Some discrepancies in nomenclature may occur, but nomenclature and systematic arrangement generally follow that of Bailey et al (1970).

The key is in general adapted from the literature, with attempts to simplify the presentation by the omission of species not expected within the area, and by omission of characters beyond those actually needed for reasonably sure identification. (The author does not believe that a key is intended as a description of a species.) No dichotomy is used for families of which only one species is likely to occur within the Sound, and this does not infer that the family in question is monotypic.

It is hoped that the use of this local key will make possible a more efficient use of the student's time in routine identification. For particularly difficult specimens, and for verification of identifications made with the key, it is recommended that the student make use of the references listed. These will provide more detailed keys making use of additional characters, descriptions, and sometimes illustrations of the fish in question. The student's attention is called to the fact that many changes in nomenclature and classification have occurred since the original publication of some of the references.

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## KEY TO THE FISHES OF MISSISSIPPI SOUND AND ADJACENT WATERS

- 1 Gill openings 5-7 on each side; digestive and urogenital systems open externally through a single outlet; no operculum; head without bones visible through skin; skeleton cartilaginous . . . **Class Chondrichthyes** (page 1)
- Gill openings single on each side; digestive and urogenital systems open externally through separate outlets; operculum present; head with bones visible through skin; skeleton usually bony. . . **Class Osteichthyes** (Page 5)

### CLASS CHONDRICHTHYES

- 1 Gill openings at least partly visible from side view; pectoral fins not attached to sides of head anterior to gill openings . . . . . **Order Squaliformes** (Page 1)
- Gill openings completely ventral, not visible from side view; pectoral fins attached to sides of head anterior to gill openings . . . . . **Order Rajiformes** (Page 3)

### ORDER SQUALIFORMES

- 1 Anal fin absent . . . . . **Squatinae** (Page 3)
- Anal fin present . . . . . 2
- 2 At least 1/2 of the base of the first dorsal is posterior to the origin of the pelvic fins . . . . . 3
- Base of first dorsal terminates over origin of the pelvic fins, and usually well anterior to them . . . . . 4
- 3 Caudal fin large, lunate; gill arches connected to each other by masses of tissue forming a seive-like structure; mouth terminal; barbels not present anterior to mouth. . . . . **Rhincodontidae** (Page 2)
- Caudal fin not very large, not lunate; gill arches not connected to each other by masses of tissue forming a seive; mouth ventral; barbels present anterior to mouth . . . . . **Orectolobidae** (Page 1)
- 4 Head with lateral extensions giving it a hammer shape or shovel shape . . . . . **Sphyrnidae** (Page 3)
- Head without lateral extensions, normally shaped . . . . . 5
- 5 Caudal fin lunate, the axis steeply raised, the upper lobe more or less equal to the lower; caudal peduncle keeled on each side . . . . . **Lamnidae** (Page 2)
- Caudal fin not lunate, the axis only slightly raised, the upper lobe much longer than the lower; caudal peduncle not keeled on each side . . . . . 6
- 6 Caudal fin approximately 1/2 of total length . . . . . **Alopiidae** (Page 2)
- Caudal fin much less than 1/2 of total length . . . . . 7
- 7 Fifth gill opening well anterior to origin of pectoral fin; nictitating membrane absent. . . . . **Odontaspidae** (Page 2)
- Fifth gill opening over or posterior to origin of pectoral fin; nictitating membrane present . . . . . **Carcharhinidae** (Page 2)

**ORECTOLOBIDAE** . . . . . *Ginglymostoma cirratum*

**RHINCODONTIDAE** . . . . . *Rhincodon typus*

**ODONTASPIDIDAE** . . . . . *Odontaspis taurus*

**ALOPIIDAE**

1    Origin of pelvic fins considerably posterior to posterior tip of first dorsal . . . . . *Alopias vulpinus*

      Origin of pelvic fins opposite or anterior to posterior tip of first dorsal . . . . . *Alopias superciliosus*

**LAMNIDAE**

1    Upper teeth slender, the cusps with smooth edges . . . . . *Carcharodon carcharias*

      Upper teeth broadly triangular, with serrate edges . . . . . *Isurus oxyrinchus*

**CARCHARHINIDAE**

1    Teeth low and rounded, in mosaic arrangement and with several rows functioning simultaneously in sides of jaws . . . . . *Mustelus canis*

      Teeth larger, bladelike, with one cusp, not in mosaic arrangement, and usually with only one or two rows functioning simultaneously in sides of jaws. . . . . 2

2    Spiracles present; low longitudinal dermal ridge on each side of caudal peduncle . . . . . *Galeocerdo cuvieri*

      Spiracles absent; no longitudinal dermal ridge on caudal peduncle. . . . . 3

3    Edges of upper teeth smooth, not serrate . . . . . 4

      Edges of upper teeth serrate . . . . . 6

4    Second dorsal almost as large as first dorsal, the base of the second at least 3/4 as long as the base of the first; posterior margin of second dorsal deeply concave . . . . . *Negaprion brevirostris*

      Second dorsal much smaller than first dorsal, the base of the second dorsal less than 1/2 as long as the base of the first, posterior margin of second dorsal nearly straight, or only slightly concave . . . . . 5

5    Teeth slender, symmetrical, and erect in both jaws; longest gill opening about 1/2 as long as base of first dorsal . . . . . *Aprionodon isodon*

      Teeth not symmetrical (their outer edges notched), and oblique (not erect) in both jaws; longest gill opening about 1/4 as long as base of first dorsal . . . . . *Rhizoprionodon terraenovae*

6    Origin of second dorsal fin over or posterior to midpoint of base of anal fin . . . . . *Carcharhinus porosus*

      Origin of second dorsal fin over origin of anal fin, or anterior to it . . . . . 7

7    A low but distinct mid-dorsal dermal ridge between first and second dorsal fins . . . . . 8

      No mid-dorsal dermal ridge between first and second dorsal fins. . . . . 10

8    Axil of pectoral fin opposite origin of first dorsal fin; vertical height of first dorsal fin at least as great as the distance from eye to second gill opening; dermal denticles loosely placed, without well developed marginal teeth. . . . . *Carcharhinus milberti*

      Axil of pectoral fin anterior to origin of first dorsal fin; vertical height of first dorsal fin less than distance from eye to first gill opening; dermal denticles regularly overlapping, with strongly marked marginal teeth . . . . . 9



- 9 Distance from tips of pelvics to origin of anal fin longer than base of anal; length of fifth gill opening at least 1.5 times the horizontal diameter of eye; vertical height of first dorsal only a little more than length of snout anterior to mouth; anterior margin of nostril not lobed . . . . . *Carcharhinus obscurus*  
Distance from tips of pelvics to origin of anal fin less than 3/4 base of anal; length of fifth gill opening about equal to horizontal diameter of eye; vertical height of first dorsal about 1.3 times length of snout anterior to mouth; anterior margin of nostril with lobe . . . . . *Carcharhinus springeri*
- 10 Distance between inner ends of nostrils more than twice length of snout anterior to a line connecting outer ends of nostrils . . . . . *Carcharhinus leucas*  
Distance between inner ends of nostrils not more than 1.5 times length of snout anterior to a line connecting outer ends of nostrils . . . . . 11
- 11 Upper teeth along inner half of jaw oblique, and markedly asymmetrical, their inner margins straight to convex, their outer margins deeply concave (notched) . . . . . *Carcharhinus acronotus*  
Upper teeth along inner half of jaw erect, and nearly symmetrical, both inner and outer margins about equally concave (notched) . . . . . *Carcharhinus limbatus*

#### SPHYRNIDAE

- 1 Anterior margin of head without indentation at midline; head shovel-shaped . . . . . *Sphyrna tiburo*  
Anterior margin of head with definite indentation at midline; head hammer-shaped . . . . . 2
- 2 Posterior tip of first dorsal fin extending past origin of pelvic fin . . . . . *Sphyrna tudes*  
Posterior tip of first dorsal fin not extending to origin of pelvic fin . . . . . 3
- 3 Posterior lobe of second dorsal fin much shorter than the anterior margin of the second dorsal, and not extending nearly to caudal pit; pelvic fin falcate; origin of first dorsal fin over axil of pectoral; second dorsal fin high, similar to anal; upper and lower teeth with well marked serrations . . . . . *Sphyrna mokarran*  
Posterior lobe of second dorsal fin at least as long as anterior margin of second dorsal, extending nearly to caudal pit; pelvic fin not falcate; origin of first dorsal posterior to axil of pectoral; upper and lower teeth usually without serrations, or else with very fine serrations . . . . . *Sphyrna lewini*

#### SQUATINIDAE . . . . . *Squatina dumerili*

### ORDER RAJIFORMES

- 1 Snout extended as a long flattened blade with a single row of large tooth-like structures on each side . . . . .  
Pristidae (Page 4)  
Snout not extended as long flattened blade . . . . . 2
- 2 Skin of disc and tail naked; well developed electric organ visible on ventral side lateral to gill openings . . . . .  
Torpedinidae (Page 4)  
Skin of disc and tail with spines, scales, or thorns; no electric organ visible on ventral side lateral to gill openings . . . . . 3
- 3 Tail stout and not well differentiated from body; dorsal and caudal fins well developed and supported by rays . . . . . Rhinobatidae (Page 4)

- 3 Tail slender and well differentiated from body; dorsal and caudal fins (if present) poorly developed and not supported by rays . . . . . 4
- 4 Outer margins of pelvic fins concave; pelvics with spur at anterior outer corners; traces of gill folds present in spiracles. . . . . 5  
Outer margins of pelvic fins straight or convex, not concave; pelvics without spur at anterior outer corners; no traces of gill folds in spiracles . . . . . 6
- 5 Two dorsal fins, situated on "tail"; snout not extended as leaflike filament; inner margins of pelvics not fused with tail . . . . . Rajidae (Page 4)  
No dorsal fin; snout extended as a leaflike appendage; inner margins of pelvics fused with tail almost to their tips . . . . . Anacanthobatidae (Page 4)
- 6 Outer margins of pectorals continuous along sides of head, without indentations posterior to eyes; anterior part of head not differentiated from rest of disc; eyes and spiracles on top of head. . . . . Dasyatidae (Page 4)  
Outer margins of pectorals with deep indentations or interruptions just posterior to eyes; anterior part of head sharply differentiated from rest of disc; eyes and spiracles on sides of head . . . . . 7
- 7 Anterior subdivisions of pectorals forming two thin, narrow, fin-like, widely separated projections; teeth minute, in many series . . . . . Mobulidae (Page 5)  
Anterior subdivisions of pectorals not forming two thin, narrow, fin-like, widely separated projections; teeth large, in few series . . . . . Myliobatidae (Page 5)

**PRISTIDAE** . . . . . *Pristis pectinata*

**RHINOBATIDAE** . . . . . *Rhinobatos lentiginosus*

**TORPEDINIDAE** . . . . . *Narcine brasiliensis*

#### **RAJIDAE**

- 1 Distance from origin of first dorsal to axils of pelvics at least as long as distance from axils of pelvics to fronts of orbits . . . . . *Raja lentiginosa*  
Distance from origin of first dorsal to axils of pelvics hardly longer than distance from axils of pelvics to rear of orbits, and usually much shorter. . . . . *Raja texana*

**ANACANTHOBATIDAE** . . . . . *Springeria foliostris*

#### **DASYATIDAE**

- 1 Disc more than 1.5 times as wide as long; tail much shorter than width of disc . . . . . *Gymnura micrura*  
Disc not more than 1.3 times as wide as long; tail longer than width of disc . . . . . 2
- 2 Tip of snout sharply projecting; margin of disc concave on either side of snout . . . . . *Dasyatis sabina*  
Tip of snout not sharply projecting; margin of disc not concave on either side of snout. . . . . 3
- 3 Outer corners of disc and posterior corners of disc narrowly rounded or subangular; tail with only a slight dorsal fold posterior to spine . . . . . *Dasyatis americana*

- 3 Outer corners of disc and posterior corners of disc broadly and evenly rounded; tail with well developed dorsal fold posterior to spine ..... *Dasyatis sayi*

#### MYLIOBATIDAE

- 1 A single fleshy, soft lobe extending forward below front of head ..... *Aetobatus narinari*  
A pair of fleshy, soft lobes joined together basally and extending forward below front of head .....  
*Rhinoptera bonasus*

- MOBULIDAE ..... *Manta birostris*

### CLASS OSTEICHTHYES

- 1 Tail heterocercal; scales neither cycloid nor ctenoid ..... 2  
Tail not heterocercal; scales cycloid or ctenoid or both, sometimes modified or absent ..... 3
- 2 Tail modified heterocercal, the lower lobe not developed and the fin rounded; mouth very large, terminal; many well developed teeth; jaws not protractile; scales rhombic, forming a dense armor; no barbels .....  
Order Semionotiformes (Page 6)  
Tail typical heterocercal, the lower lobe well developed, and the fin not rounded; mouth small and inferior; without teeth in adults; jaw protractile; scales not rhombic, forming five longitudinal rows of large plates; barbels on snout anterior to mouth. .... Order Acipenseriformes (Page 6)
- 3 Pectoral fins always present, pediculate; gill openings small, posterior to pectoral fins or only slightly anterior. .... Order Lophiiformes (Page 10)  
Pectoral fins (if present) not pediculate; gill openings either large or small, anterior to pectoral fins. .... 4
- 4 Anterior dorsal fin modified into a laminated suction disc. .... Order Perciformes (in part) (Page 14)  
Dorsal fin typical, not forming suction disc ..... 5
- 5 One or more spines present in dorsal fin. .... 6  
No spines in dorsal fin ..... 9
- 6 Dorsal fin with one spine at anterior edge; pectoral fins each with a single spine; adipose fin present; scales absent. .... Order Siluriformes (Page 10)  
Dorsal fin with one or more spines at anterior edge; pectoral fins without spines; no adipose fin; scales usually present ..... 7
- 7 Spines not present in anal fin; scales modified to form carapace, or to give velvety texture to skin; maxillary and premaxillary fused; pelvic fins absent, or represented by single spine which may or may not protrude through skin. .... Order Tetraodontiformes (Page 30)  
Spines present in anal fin; scales (when present) typical cycloid or ctenoid, or both; maxillary and premaxillary not fused; pelvic fins (if present) normally developed ..... 8
- 8 Pelvic fins large, jugular, with 1 spine, 2 or 3 rays; gill arches 3; scales absent .....  
Order Batrachoidiformes (Page 10)  
Pelvic fins usually with 1 spine, 5 rays; gill arches usually 4; scales usually present .....  
Order Perciformes (in part) (Page 14)

- 9 Pelvic fins present ..... 10  
Pelvic fins absent. .... 17
- 10 Mouth small, at end of tubular snout ..... **Order Gasterosteiformes (Page 14)**  
Mouth not small, not at end of tubular snout ..... 11
- 11 Pelvic fins forming part of a ventral suction disc; head depressed; without scales .....  
**Order Gobiesociformes (Page 10)**  
No ventral suction disc; head not depressed; scales present ..... 12
- 12 Both eyes on same side of head ..... **Order Pleuronectiformes (Page 29)**  
Eyes on different sides of head ..... 13
- 13 Adipose fin present ..... **Order Myctophiformes (Page 10)**  
Adipose fin absent ..... 14
- 14 Pelvic fins jugular, barbel-like ..... **Order Gadiformes (Page 11)**  
Pelvic fins abdominal ..... 15
- 15 Head with scales; pelvic fins approximately equal to pectorals; head not usually compressed; body not particularly compressed; lower jaws (or both jaws) sometimes forming beak ..... **Order Atheriniformes (Page 12)**  
Head usually without scales; pelvic fins much smaller than pectorals; head and body compressed; jaws never forming beak ..... 16
- 16 Gular plate in chin region between lower jaw bones; lateral line pores present . . . **Order Elopiformes (Page 7)**  
No gular plate; no lateral line pores. .... **Order Clupeiformes (Page 8)**
- 17 Body anguilliform; dorsal and anal fins long and continuous with caudal (if caudal is present) .....  
**Order Anguilliformes (Page 7)**  
Body not anguilliform; dorsal and anal fins not long and continuous with caudal. .... 18
- 18 Small mouth at end of tubular snout; body elongate, covered with bony plates, caudal fin sometimes absent; tail elongate; male with ventral brood pouch for carrying eggs ..... **Order Gasterosteiformes (Page 14)**  
Mouth not at end of tubular snout; body not elongate; caudal fin always present; tail not elongate; male without brood pouch. .... **Order Tetraodontiformes (Page 30)**

## ORDER ACIPENSERIFORMES

**ACIPENSERIDAE** ..... *Acipenser oxyrinchus*

## ORDER SEMIONOTIFORMES

### LEPISOSTEIDAE

- 1 Distance between nostrils less than diameter of eye; snout long and slender, much longer than rest of head ..... *Lepisosteus osseus*  
Distance between nostrils greater than diameter of eye; snout shorter and broader, approximately equal in length to rest of head. .... 2

- 2 Two rows of large teeth on each side of upper jaw in large young and adults . . . . . *Lepisosteus spatula*  
One row of large teeth on each side of upper jaw in large young and adults . . . . . *Lepisosteus oculatus*

## ORDER ELOPIFORMES

### ELOPIDAE

- 1 Last ray of dorsal fin forming a long filament; anal fin larger than dorsal; no pseudobranchiae; scales very large . . . . . *Megalops atlantica*  
Last ray of dorsal fin not forming a long filament; anal fin not larger than dorsal; pseudobranchiae well developed; scales small . . . . . *Elops saurus*

## ORDER ANGUILLIFORMES

- 1 Posterior nares on upper lip, below level of lower margin of eye . . . . . *Ophichthidae* (Page 7)  
Posterior nares above upper lip, on level of lower margin of eye, or higher . . . . . 2
- 2 Pectoral fins absent; gill opening not larger than eye . . . . . *Muraenidae* (Page 7)  
Pectoral fins present; gill opening larger than eye . . . . . 3
- 3 Scales present (may be deeply embedded in skin); lower jaw somewhat projecting . . . . . *Anguillidae* (Page 7)  
Scales not present; upper jaw projecting at least slightly . . . . . *Congridae* (Page 7)

ANGUILLIDAE . . . . . *Anguilla rostrata*

MURAENIDAE . . . . . *Gymnothorax nigromarginatus*

### CONGRIDAE

- 1 Snout projecting well beyond lower jaw; upper lip without upturned fold; caudal fin relatively long . . . . . *Congrina flava*  
Snout projecting but little beyond lower jaw; upper lip with a well developed upturned fold; caudal fin relatively short . . . . . 2
- 2 Origin of dorsal fin over base of pectoral fins; teeth in outer row moderately spaced, pointed . . . . . *Ariosoma impressa*  
Origin of dorsal fin over middle of pectoral fins; teeth in outer row closely set, incisor-like . . . . . *Paraconger caudilimbatus*

### OPHICHTHIDAE

- 1 Caudal fin present, continuous with dorsal and anal . . . . . 2  
Caudal fin not present, dorsal and anal fins ending at some distance from posterior end of body . . . . . 3
- 2 Origin of dorsal fin anterior to vent; palatal teeth in two rows anteriorly, joining to become one row posteriorly, and extending back to a point opposite angle of mouth . . . . . *Myrophis punctatus*



- 5 Upper margin of lower jaw within mouth rising gently; specimens of more than 200 mm length without teeth; cheek deeper than long . . . . . *Alosa alabamae*  
Upper margin of lower jaw within mouth rising abruptly; teeth present (at least in lower jaw) at all ages; cheek not deeper than long . . . . . *Alosa chrysochloris*
- 6 Pelvic fin with inner rays (or middle rays) as long as outer rays; frontal groove well developed; shoulder spot followed by variable number of smaller dark spots in adults; opercular striations usually more than 12; scale pectinations pointed; scales large, fairly regularly placed, with 35-36 oblique series crossing lateral midline . . . . . *Brevoortia patronus*  
Pelvic fin with inner rays much shorter (not more than 2/3) than outer rays; frontal groove absent; shoulder spot not followed by series of smaller dark spots; opercular striations fewer than 14; scale pectinations rounded; scales small, irregularly placed, with about 60-75 oblique series crossing lateral midline . . . . . 7
- 7 Maxillary not extending posteriorly past posterior margin of pupil; maxillary 2.0-2.4 in head length; head length 3.1-3.5 in standard length; 5-8 vertical series of scales between tip of appressed pectoral and base of pelvic fin; ventral scutes 30-32 (usually 30). . . . . *Brevoortia smithi*  
Maxillary extending posteriorly to or past posterior margin of pupil; maxillary 1.8-2.2 in head length; head length 2.8-3.2 in standard length; fewer than 5 vertical series of scales between tip of appressed pectoral and base of pelvic fin; ventral scutes 27-30 (usually 28-29) . . . . . *Brevoortia gunteri*
- 8 Last dorsal ray greatly elongated, filamentous, sometimes reaching more or less to base of caudal fin; anal rays 20-25 . . . . . *Opisthonema oglinum*  
Last dorsal ray little elongated, if any; anal rays 15-20 . . . . . 9
- 9 Last two anal rays not enlarged; gill rakers about 25-40 on lower limb of gill arch; about 34-41 oblique rows of scales crossing lateral midline; pelvic rays 8. . . . . *Harengula pensacolae*  
Last two anal rays enlarged, finlet-like; about 70-130 gill rakers on lower limb of gill arch; about 41-47 oblique rows of scales crossing lateral midline; pelvic rays 9 . . . . . *Sardinella brasiliensis*
- 10 Mouth terminal; ventral edge of mouth smooth; fewer than 50 scales in lateral series, regularly arranged; anal rays 17-27; prepelvic scutes usually 14-16, rarely 17. . . . . *Dorosoma petenense*  
Mouth subterminal or inferior; ventral edge of upper jaw with pronounced notch; more than 50 scales in lateral series, irregularly arranged; anal rays 25-36, usually 29-35; prepelvic scutes 17-20 . . . . *Dorosoma cepedianum*

#### ENGRAULIDAE

- 1 Anal rays 25 or more; base of anal fin 2.8-4.0 in standard length . . . . . *Anchoa mitchilli*  
Anal rays less than 25; base of anal fin 4.0-6.0 in standard length . . . . . 2
- 2 Origin of anal fin under or posterior to base of last dorsal ray; silvery lateral band as wide as diameter of eye . . . . . *Anchoa lyolepis*  
Origin of anal fin anterior to base of last dorsal ray; silvery lateral band not as wide as diameter of eye . . . . 3
- 3 Gill rakers on lower limb usually 16-22, on upper limb usually 14-20 (rarely 13 or 21); greatest body depth 4.5-5.4 in standard length . . . . . *Anchoa hepsetus*  
Gill rakers on lower limb of gill arch 23-33, on upper limb 18-23 (very slender, closely placed, and difficult to count); greatest body depth 5.5-6.5 in standard length . . . . . *Anchoa cubana*

## ORDER MYCTOPHIFORMES

### SYNODONTIDAE

- 1 Scales small, 60-64 in lateral line; dorsal fin with 9-10 rays; 7 rows of scales on cheek; lateral line without keel posteriorly; no shoulder spot. . . . . *Synodus foetens*
- Scales large, about 48 in lateral line; dorsal fin with 11 rays; 4-6 rows of scales on cheek; lateral line with blunt keel posteriorly; a large black spot on upper shoulder, hidden by operculum. . . . . *Synodus intermedius*

## ORDER SILURIFORMES

### ARIIDAE

- 1 Lower jaws with 2 barbels; maxillary barbels very long, flat, and ribbon-shaped; dorsal and pectoral spines with elongated filaments . . . . . *Bagre marinus*
- Lower jaws with 4 barbels; maxillary barbels not particularly long, not flat and ribbon-shaped (circular in cross-section); dorsal and pectoral spines without elongated filaments . . . . . *Arius felis*

## ORDER BATRACHOIDIFORMES

### BATRACHOIDIDAE

- 1 Three dorsal spines; operculum developed into two strongly diverging spines; subopercle with two spines; pectoral axil with a large foramen; lateral line not composed of pores and shining spots . . . . . *Opsanus beta*
- Two dorsal spines; operculum very small, developed posteriorly as a single strong spine; subopercle not ending in a spine; pectoral axil without a foramen; lateral line composed of pores and shining spots . . . . . *Porichthys porosissimus*

## ORDER GOBIESOCIFORMES

- GOBIESOCIDAE . . . . . *Gobiesox strumosus*

## ORDER LOPHIIFORMES

- 1 Gill openings in or behind upper axil of pectoral fin; mouth small, inferior. . . . . *Ogcocephalidae* (Page 11)
- Gill openings in or behind lower axil of pectoral fin; mouth large and terminal . . . . . 2
- 2 Head strongly depressed, wide, very large; mouth enormous, with very strong, unequal, cardiform teeth, some of them canine-like; pseudobranchiae present . . . . . *Lophiidae* (Page 10)
- Head compressed; mouth large, with cardiform teeth, canine teeth not present; no pseudobranchiae . . . . . *Antennariidae* (Page 10)

- LOPHIIDAE . . . . . *Lophius americanus*

### ANTENNARIIDAE

- 1 Skin naked and smooth; pelvic fins long; pectoral fins slender, with slender wrist; no large ocellated spots . . . . *Histrio histrio*



- 1 Skin covered with prickles, not smooth; pelvic fins short; pectoral fins rather wide, with wide wrist; one or more large ocellated spots present . . . . . 2
- 2 One ocellated spot under middle of soft dorsal fin; first dorsal spine with trifold "bait" at tip; pectoral rays not branched . . . . . *Antennarius radiosus*  
 Usually one ocellated spot under middle of soft dorsal, with another beneath it on side of body, and a third (if present) on caudal peduncle; first dorsal spine with simple, undivided "bait" at tip; pectoral rays branched . . . . . *Antennarius ocellatus*

#### OGCOCEPHALIDAE

- 1 Frontal region of disc elevated, with snout extending forward; tail stout; eyes lateral; mouth subinferior . . . . . *Ogcocephalus nasutus*  
 Frontal region of disc depressed (not elevated), without extended snout (snout rounded); tail slender; eyes partly superior; mouth terminal . . . . . *Halieutichthys aculeatus*

### ORDER GADIFORMES

- 1 Dorsal fin 2; dorsal and anal fins not continuous with caudal fin. . . . . Gadidae (Page 11)  
 Dorsal fin single; dorsal and anal fins continuous with caudal fin . . . . . Ophidiidae (Page 11)

#### GADIDAE

- 1 Lateral line scales 90-95; dorsal rays 9 plus 43; anal rays 45. . . . . *Urophycis regius*  
 Lateral line scales about 120; dorsal rays 13 plus 57; anal rays 50 . . . . . *Urophycis floridanus*

#### OPHIDIIDAE

- 1 Upper and lower jaw each with 3 barbels on each side. . . . . *Brotula barbata*  
 No barbels on jaws . . . . . 2
- 2 Head scaled; snout with spine at tip . . . . . 3  
 Head without scales; snout without spine at tip. . . . . 4
- 3 Dorsal fin pale, with broad, shallow lunate spots along edge; anal fin black above and below, pale in center; gill rakers 8-9 . . . . . *Lepophidium jeannae*  
 Dorsal fin pale, without black edge or lunate spots; anal fin pale, without black; gill rakers about 6. . . . . *Lepophidium graellsii*
- 4 Sides of body with stripes. . . . . *Ophidion welshi*  
 Sides of body without stripes . . . . . 5
- 5 Opercle ending in a flat point behind, without spine; dorsal fin pale, with black edge; anal fin pale, with black margin; no jet black, round spot on scapular region . . . . . *Rissola marginata*  
 Opercle ending behind in a spine usually concealed in the skin; dorsal fin not pale with black edge . . . . . 6

- 6 Dorsal fin pale, with black blotches; anal fin largely black; a jet black, round spot on scapular region . . . . .  
*Otophidium omostigmum*
- Dorsal fin not pale with black blotches, but its posterior half brownish with pale edge; anal fin not largely black, but its posterior 3/4 brownish with pale edge; no black spot on scapular region . . . . .  
*Gunterichthys longipenis*

## ORDER ATHERINIFORMES

- 1 Lower jaws (or both jaws) forming a long beak . . . . . 2  
 Jaws not forming long beak . . . . . 3
- 2 Both jaws produced, forming a beak . . . . . **Belonidae** (Page 12)  
 Upper jaw short, lower jaw produced . . . . . **Exocoetidae** (Page 12)
- 3 First dorsal fin with 3-6 flexible spines; anal fin with a single weak spine . . . . . **Atherinidae** (Page 13)  
 First dorsal fin without spines; anal fin without spine . . . . . 4
- 4 Anal fin of male modified to form elongated intromittent organ (gonopodium); third anal ray (counting rudimentary rays) unbranched in both sexes; viviparous . . . . . **Poeciliidae** (Page 13)  
 Anal fin of male not modified to form intromittent organ; third anal ray branched (may not be completely divided in immature specimens, and sometimes not branched in *Lucania*); oviparous . . . . .  
**Cyprinodontidae** (Page 13)

## EXOCOETIDAE

- 1 Pelvic fins inserted far anterior to dorsal fin, usually about midway between base of caudal fin and gill opening; air bladder simple; caudal fin slightly lobed; scales present on snout; preorbital ridge well developed; anal rays usually 15-17 . . . . . *Hyporhamphus unifasciatus*
- Pelvic fins inserted only slightly anterior to dorsal fin, much closer to base of caudal fin than to gill opening; air bladder cellular (divided into sections); caudal fin deeply bilobed; scales absent on snout; preorbital ridge absent; anal rays usually 10-13 . . . . . *Hemiramphus brasiliensis*

## BELONIDAE

- 1 Caudal peduncle deeper than wide, without trace of keel along lateral line; anal rays 13-16; dorsal rays 13 . . . . . *Strongylura notata*
- Caudal peduncle somewhat depressed, with evident keel along lateral line; anal rays 15-28; dorsal rays 15-26 . . . . . 2
- 2 Dorsal rays 15; anal rays 16-20; pelvics inserted closer to base of caudal fin than to middle of eye . . . . .  
*Strongylura marina*
- Dorsal rays 21-26; anal rays 19-28; pelvics inserted midway between base of caudal fin and middle of eye . . . 3
- 3 Anal rays 25-28; head and body strongly compressed; scales very small, about 520 in lateral line . . . . .  
*Ablennes hians*
- Anal rays 19-23; head and body not strongly compressed; scales larger, about 350 in lateral line . . . . .  
*Tylosurus crocodilus*

1	Teeth incisor-like and notched, with 2 or 3 cusps . . . . .	2
	Teeth pointed or conical, not with several cusps . . . . .	3
2	Opercular opening closed above by union of gill membrane to shoulder just above base of pectoral fin . . . . .	<i>Cyprinodon variegatus</i>
	Opercular opening closed by union of gill membrane to shoulder some distance above pectoral fin base, about half the distance to upper corner of opercle . . . . .	<i>Floridichthys carpio</i>
3	Teeth in a single row . . . . .	<i>Lucania parva</i>
	Teeth in more than one row . . . . .	4
4	Less than 30 scales in body length; upper margin of gill membrane joined to shoulder just above base of pectoral fin . . . . .	<i>Adinia xenica</i>
	More than 30 scales in body length; margin of gill membrane not joined to shoulder just above base of pectoral fin . . . . .	5
5	Origin of dorsal fin distinctly anterior to front of anal fin . . . . .	6
	Origin of dorsal fin above or slightly posterior to front of anal fin . . . . .	7
6	Sides of body with 10-15 narrow, distinct, dark vertical bars; 35 or less scales in lateral series; 6 branchiostegals . . . . .	<i>Fundulus similis</i>
	Sides of body with wide, diffuse, dark vertical bars; 35 or more scales in lateral series; 5 branchiostegals . . . . .	<i>Fundulus grandis</i>
7	Dorsal rays 7-9 . . . . .	<i>Fundulus jenkinsi</i>
	Dorsal rays 10-17 . . . . .	8
8	Longitudinal stripes on scale rows of sides; more than 40 scales in lateral series . . . . .	<i>Fundulus confluentus</i>
	Scattered dots and vertical blotches on sides; less than 40 scales in lateral series . . . . .	<i>Fundulus pulvereus</i>

1	Origin of dorsal fin over or anterior to anal fin; dorsal fin long and high; dorsal rays more than 12 . . . . .	<i>Poecilia latipinna</i>
	Origin of dorsal fin behind origin of anal fin; dorsal rays less than 12 . . . . .	2
2	Dorsal rays 7-8; anal fin rays 6-9; 24-28 scales in body length; sides marked with lateral band and cross-bars; black spot in dorsal and anal fins . . . . .	<i>Heterandria formosa</i>
	Dorsal rays 7-9; anal rays 8-10; 29-32 scales in body length; sides not marked with lateral band and cross-bars; no black spot in dorsal and anal fins . . . . .	<i>Gambusia affinis</i>

1 Scales with crenate or laciniate edges, feeling very rough to the touch; dorsal and anal fins with large scales ..... *Membras martinica*

- 1 Scales with smooth edges, smooth to the touch; dorsal and anal fins without scales . . . . . *Menidia beryllina*

## ORDER GASTEROSTEIFORMES

- 1 Pelvic fins present . . . . . *Fistulariidae* (Page 14)  
Pelvic fins absent . . . . . *Syngnathidae* (Page 14)

**FISTULARIIDAE** . . . . . *Fistularia tabacaria*

## SYNGNATHIDAE

- 1 Tail prehensile, usually decurved, caudal fin absent; axis of head at right angle to body. . . . . 2  
Tail not prehensile, usually straight; caudal fin present; axis of head in line with body . . . . . 3  
2 Dorsal rays more than 16; pectoral rays more than 14; caudal segments 33 or more . . . . *Hippocampus erectus*  
Dorsal rays less than 15; pectoral rays less than 13; caudal segments less than 35 . . . . *Hippocampus zosterae*  
3 Number of tail rings 4-7 more than number of trunk rings; brood pouch under belly; individual rings with very spiny projections; head in standard length 4.6-5.8 . . . . . *Oostethus lineatus*  
Number of tail rings at least 8-10 more than number of trunk rings; brood pouch under tail; individual rings usually without spiny projections; head in standard length 5.4-12.3 . . . . . 4  
4 Dorsal fin entirely posterior to anus; snout very short, more than 3 times in head . . . *Micrognathus crinigerus*  
Dorsal fin partly anterior to anus; snout not very short, less than 3 in head. . . . . 5  
5 Snout short, 2 times or more in head . . . . . *Syngnathus scovelli*  
Snout longer and slender, 2 times or less in head . . . . . 6  
6 Body rings 16-19; body slightly hexagonal in cross-section in females (square in males). . . *Syngnathus floridae*  
Body rings 19-23; body almost square in cross-section in females (also in males) . . . . . 7  
7 Body rings 23; pectoral rays 13 . . . . . *Syngnathus springeri*  
Body rings 19-21, usually 20; pectoral rays 14-15 . . . . . *Syngnathus louisianae*

## ORDER PERCIFORMES

- 1 Anterior dorsal fin modified into a laminated suction disc. . . . . *Echeneidae* (Page 18)  
Dorsal fin typical, without suction disc . . . . . 2  
2 Nostrils single on each side . . . . . *Pomacentridae* (Page 24)  
Nostrils double on each side . . . . . 3  
3 Cheeks crossed by bony suborbital stays . . . . . 4  
Cheeks without bony suborbital stays . . . . . 5  
4 Lower pectoral rays free and finger-like . . . . . *Triglidae* (Page 28)  
Lower pectoral rays not free and finger-like . . . . . *Scorpaenidae* (Page 27)

- 5 Pelvic fin subabdominal; first dorsal fin well separated from second dorsal . . . . . 6  
Pelvic fins thoracic, jugular, or absent; dorsal fin single or double (if double, the two parts not widely separated) . . . . . 8
- 6 Pectoral fins with free flexible rays on anterior edge . . . . . **Polynemidae** (Page 25)  
Pectoral fins without free anterior rays . . . . . 7
- 7 Lateral line distinct; teeth strong, unequal; mouth large with produced jaws . . . . . **Sphyrnidae** (Page 24)  
Lateral line not distinct (either interrupted, or with sensory pores in several rows); teeth small or absent; mouth small . . . . . **Mugilidae** (Page 24)
- 8 Pelvic fins absent . . . . . 9  
Pelvic fins present . . . . . 10
- 9 Caudal fin absent, the tail tapering to a point; dorsal and anal fins long, low, and continuous; body ribbon-like . . . . . **Trichiuridae** (Page 27)  
Caudal fin present; tail not tapering to a point; anterior part of dorsal and anal fins falcate (raised anteriorly); body not ribbon-like . . . . . **Stromateidae** (Page 27)
- 10 Pelvic fins thoracic . . . . . 11  
Pelvic fins jugular or ventral in position . . . . . 28
- 11 Scales (when present) cycloid, usually small or degenerate, or modified into scutes; caudal peduncle usually narrow, sometimes with a keel; caudal fin deeply forked; finlets may be present . . . . . 12  
Scales ctenoid (sometimes cycloid); scales always present, never modified into scutes; caudal peduncle deep; caudal fin usually truncate, emarginate, or rounded, never deeply forked; finlets absent . . . . . 16
- 12 Dorsal and anal fins with 3 or more finlets; scales minute or virtually absent . . . . . **Scombridae** (Page 27)  
Finlets usually absent, only one at most; scales well developed . . . . . 13
- 13 Dorsal spines free, not connected by membrane . . . . . **Rachycentridae** (Page 18)  
Dorsal spines (if present) usually not free, or at most only a few of them free . . . . . 14
- 14 Anal fin without free spines . . . . . **Coryphaenidae** (Page 20)  
Anal fin preceded by two free spines . . . . . 15
- 15 Scales minute or obsolete; scales on posterior part of lateral line often developed into hard bony scutes; tail deeply forked (if body is oblong, scales do not form scutes and tail is less forked) . . . . . **Carangidae** (Page 19)  
Scales moderate in size; lateral line without scutes; tail not deeply forked . . . . . **Pomatomidae** (Page 18)
- 16 Scales large, cycloid; teeth strong or fused into a beak . . . . . 17  
Scales ctenoid or variable; teeth variable, but not fused into a beak . . . . . 18
- 17 Teeth in jaws conical or tubercular, usually somewhat directed forward . . . . . **Labridae** (Page 24)  
Teeth in jaws fused into a parrot-like beak, with individual teeth usually not distinguishable . . . . . **Scaridae** (Page 24)

- 18 Body strongly compressed, deep; vertical fins scaled; mouth small; teeth sharp; scales ctenoid . . . . . 19  
Vertical fins not scaled if body is deep and compressed; mouth, teeth, and scales variable . . . . . 20
- 19 Dorsal fin double; body marked by series of dark vertical bars . . . . . **Ephippidae** (Page 23)  
Dorsal fin continuous (single); body not marked with a series of dark vertical bars. . **Chaetodontidae** (Page 24)
- 20 Maxillary not slipping for most of its length under the edge of the preorbital, which forms a more or less distinct sheath; opercle usually with a terminal spine; pelvic fins sometimes with a small accessory scale at the base. . . . . 21  
Maxillary slipping for most of its length under the edge of the preorbital, which forms a more or less distinct sheath; opercle without spines; pelvic fins with an accessory scale . . . . . 24
- 21 Anal fin approximately equal to dorsal; vomer without teeth; dorsal and anal fins elongate posteriorly; body deep and compressed . . . . . **Lobotidae** (Page 21)  
Anal fin smaller than dorsal; vomer with teeth; dorsal and anal fins not elongate posteriorly; body variable. . . 22
- 22 No spines in anal fin. . . . . **Grammistidae** (Page 18)  
Spines present in anal fin. . . . . 23
- 23 Dorsal fin double; sides with definite dark longitudinal stripes . . . . . **Percichthyidae** (Page 17)  
Dorsal fin single, sometimes deeply divided; sides without definite dark longitudinal stripes. . . . . **Serranidae** (Page 17)
- 24 Anal fin with one or two spines; lateral line extending onto caudal fin. . . . . **Sciaenidae** (Page 22)  
Anal fin with 3 spines; lateral line not extending onto caudal fin. . . . . 25
- 25 Vomer with teeth . . . . . **Lutjanidae** (Page 20)  
Vomer without teeth. . . . . 26
- 26 Premaxillary spine greatly produced, sliding into a groove dorsally between the eyes; mouth extremely protractile . . . . . **Gerreidae** (Page 21)  
Premaxillary spine not greatly produced; mouth less protractile . . . . . 27
- 27 Teeth on sides of jaws molariform . . . . . **Sparidae** (Page 22)  
Teeth on sides of jaws not molariform. . . . . **Pomadasyidae** (Page 21)
- 28 Eyes on top of head, directed upward; mouth superior, with vertical gape; lips fringed . . . . . 29  
Eyes not on top of head, or mouth not superior and vertical, or lips not fringed . . . . . 30
- 29 Lateral line well developed; dorsal spines about 12; pelvic rays 3. . . . . **Dactyloscopidae** (Page 25)  
Lateral line obscure; dorsal spines 3-5, or absent; pelvic rays 5 . . . . . **Uranoscopidae** (Page 25)
- 30 Pelvic rays 5; pelvic separate or sometimes united to form a suction disc; dorsal fin double . . . . . 31  
Pelvic rays 3; pelvics not joined; dorsal fin not double . . . . . 32

- 31 Pelvic fins joined to form suction disc . . . . . **Gobiidae** (Page 26)  
 Pelvic fins separate, not forming suction disc . . . . . **Eleotridae** (Page 25)
- 32 Body extremely elongate and eel-like; dorsal with more than 65 rays-plus-spines . . . . **Microdesmidae** (Page 27)  
 Body not extremely elongate and eel-like; dorsal with fewer than 65 rays-plus-spines . . . . **Blenniidae** (Page 25)

**PERCICHTHYIDAE** . . . . . *Morone saxatilis*

# **SERRANIDAE**

- 1 Branchiostegals 6 . . . . . 2  
 Branchiostegals 7 (the inner one may be very small and inconspicuous) . . . . . 3
- 2 Caudal fin truncate . . . . . *Serranus subligarius*  
 Middle rays of caudal fin longer than outer rays . . . . . *Serraniculus pumilio*
- 3 Supplemental maxillary present; canine teeth usually present, at least in front of jaws; jaw teeth depressible; anal rays 8-13 . . . . . 4  
 Supplemental maxillary absent; canine teeth (if present) on sides of jaws; jaw teeth not depressible; anal rays 7 . . . . . 10
- 4 Anal rays 8-10, usually 8 or 9 . . . . . 5  
 Anal rays usually 10-13 . . . . . 8
- 5 Body light with dark red spots which are much larger on the ventral surface; 3 saddle-shaped blotches along base of dorsal fin and on top of caudal peduncle; no scales on exposed surface of maxillary bone . . . . . *Epinephelus adscensionis*  
 Body variously colored; if red spots are present, they are not largest ventrally, and maxillary is scaled on its exposed surface; never more than one saddle-shaped dark blotch . . . . . 6
- 6 Dorsal fin membrane not indented between the spines . . . . . *Epinephelus morio*  
 Dorsal fin membrane indented between the spines . . . . . 7
- 7 Margin of spinous dorsal and anterior part of soft dorsal yellow . . . . . *Epinephelus flavolimbatus*  
 Margin of spinous dorsal and anterior part of soft dorsal not yellow . . . . . *Epinephelus nigritus*
- 8 Preopercle rounded, without distinct spiny lobe or abrupt angle . . . . . *Mycteroperca bonaci*  
 Preopercle with the upper and lower limbs meeting at nearly a right angle, with a more or less distinct serrated lobe at the angle above which there is a slight notch . . . . . 9
- 9 Scales very small, about 120-140 in lateral series; posterior nostril only slightly larger than the anterior in fish under 350 mm, somewhat larger in fish over this length; vertical fins never with exserted rays; color gray without distinctive markings or with dark vermiculations which tend to be grouped in squarish or rounded clusters . . . . . *Mycteroperca microlepis*  
 Scales larger, usually less than 120 in lateral series; posterior nostril much larger than anterior in fish over 250 mm; vertical fins of large specimens with exserted rays; color light grayish brown, with distinct small spots grouped in squarish or rounded clusters . . . . . *Mycteroperca phenax*

- 10 Gill rakers very long, slender, and closely placed; lateral line placed high on sides, running close to back; caudal fin deeply forked, the lobes produced . . . . . *Paranthias furcifer*  
 Gill rakers comparatively short and widely spaced; lateral line not running close to back; caudal fin double concave, 3-lobed, lunate, or otherwise not deeply forked . . . . . 11
- 11 Dorsal rays 10-11; caudal fin 3-lobed, double concave, or at least not lunate; dorsal spines slender, some of them with dermal appendages or filaments . . . . . 12  
 Dorsal rays 12-13; caudal fin lunate; dorsal spines without filaments, not elongate . . . . . 14
- 12 Ground color dark, belly only slightly lighter than sides of body; sides with beadlike longitudinal lines of light spots; dermal flaps of dorsal spines extending past tips of spines; total gill rakers (including tubercles) 21-25; lateral line scales 47-49; dorsal fin with series of whitish spots and bands . . . *Centropristis melana*  
 Ground color pale, belly much lighter than sides; bars (diffuse or distinct) on sides; dermal flaps of dorsal spines either very short or very long; total gill rakers (including tubercles) 18-21; lateral line scales 50-57; dorsal fin with series of dark spots . . . . . 13
- 13 Dermal flaps of dorsal spines scarcely extending beyond tips of spines; no distinct black blotch at base of last three dorsal spines; distinct black blotch at center of fourth vertical bar just below lateral line; lateral bars usually distinct, their lower third often represented as a series of small dark spots; pectoral rays 16-18, usually 17; 7 rows of cheek scales . . . . . *Centropristis ocyurus*  
 Dermal flaps of dorsal spines projecting considerably beyond tips of spines; distinct black blotch at base of last three dorsal spines; no distinct black blotch at center of fourth vertical bar; lateral bars diffuse, their lower third never a series of dark spots; pectoral rays 14-19, usually 18; 9-11 rows of cheek scales . . . . . *Centropristis philadelphia*
- 14 Preopercle with numerous strong, diverging spines at its angle, diverging from one or two centers; scales in lateral series 62-90; gill rakers 14-15; soft dorsal with three blue stripes and four yellow ones . . . . . *Diplectrum formosum*  
 Preopercle finely serrate, without strong spines diverging from one or two centers; lateral line scales 47-51; gill rakers 17-20; soft dorsal, caudal, anal, and pectoral fins not spotted . . . . . *Serranus phoebe*

GRAMMISTIDAE . . . . . *Rypticus saponaceus*

POMATOMIDAE . . . . . *Pomatomus saltatrix*

RACHYCENTRIDAE . . . . . *Rachycentron canadum*

#### ECHENEIDAE

- 1 Body very slender; disc with 20-28 laminae; lower jaw produced; pectoral fins acute . . . . *Echeneis naucrates*  
 Body rather robust; disc with 13-18 laminae; lower jaw not produced; pectoral fins rounded . . . . . 2
- 2 Pectoral rays stiff and ossified; posterior edge of disc extending beyond tip of pectoral fin; light brown above, lighter below . . . . . *Remora osteochir*  
 Pectoral rays soft and flexible; posterior edge of disc not extending beyond tip of pectoral fin; color rather uniform above and below . . . . . 3
- 3 Disc with about 18 laminae; soft dorsal with 23 rays; rather uniform blackish above and below . . *Remora remora*  
 Disc with 13-14 laminae; soft dorsal with 22 rays; uniform grayish brown . . . . . *Remora albescens*



## CARANGIDAE

- 1 Dorsal and anal fins followed by one or more fin-like rays. . . . . 2  
Dorsal and anal fins not followed by detached fin-like rays . . . . . 4
- 2 Premaxillaries not protractile (except in very young); no supplemental maxillary present . . . *Oligoplites saurus*  
Premaxillaries protractile; supplemental maxillary present . . . . . 3
- 3 Anal fin much shorter than soft dorsal, its base not longer than the abdomen; pectoral fin short, not falcate;  
dorsal and anal fins each with a detached two-rayed finlet. . . . . *Elagatis bipinnulata*  
Anal fin about as long as soft dorsal, its base longer than abdomen; pectoral fin long, falcate; dorsal and anal  
fins each with a single detached finlet . . . . . *Decapterus punctatus*
- 4 Anal fin much shorter than soft dorsal, its base not longer than abdomen . . . . . 5  
Anal fin about as long as soft dorsal, its base longer than abdomen . . . . . 7
- 5 Scales in lateral line 122-135; dorsal and anal fins falcate; head deeper than long, the anterior profile steep;  
no yellow longitudinal lateral band; size small. . . . . *Seriola rivoliana*  
Scales in lateral line 141-187; dorsal and anal not falcate; head longer than deep, the profile not very steep;  
yellow lateral band present; size large . . . . . 6
- 6 Dorsal with 7 spines, 30-35 rays (in large specimens); lateral line scales 141-163; no dark cross bands . . . . .  
*Seriola dumerili*  
Dorsal usually with 8 spines, 33-40 rays; lateral line scales 160-187; sides of body with broad black bars . . . . .  
*Seriola zonata*
- 7 No supplemental maxillary present; lateral line unarmed posteriorly; pectoral fin short, not falcate; lateral  
line little arched anteriorly . . . . . 8  
Supplemental maxillary present, lateral line usually armed posteriorly, arched anteriorly; pectoral fin long,  
falcate. . . . . 10
- 8 Dorsal rays 23-27; anal rays 20-28; body rather robust . . . . . *Trachinotus carolinus*  
Dorsal rays 18-21; anal rays 16-18 . . . . . 9
- 9 No cross bars on body; dorsal lobe in large specimens moderately long, reaching about to base of caudal fin;  
body moderately compressed. . . . . *Trachinotus falcatus*  
Cross bars on body (except in small specimens); dorsal lobe in large specimens very long, reaching consid-  
erably beyond base of caudal fin; body very much compressed. . . . . *Trachinotus goodei*
- 10 Ventral profile of body more deeply curved than dorsal profile; dark spot on upper part of caudal pe-  
duncle. . . . . *Chloroscombrus chrysurus*  
Ventral profile of body not more deeply curved than dorsal profile; no dark spot on upper part of caudal  
peduncle . . . . . 11
- 11 Lateral line with well developed scutes for its entire length . . . . . *Trachurus lathami*  
Lateral line without well developed scutes for its entire length . . . . . 12

- 12 Lateral line without any scutes. . . . . *Selene vomer*  
Lateral line with scutes on its straight posterior part only (these sometimes very few and small) . . . . . 13
- 13 Lateral line scutes weakly developed, very little carinated . . . . . 14  
Lateral line scutes well developed, bony, and spinous . . . . . 16
- 14 Lateral line scarcely arched anteriorly; scales comparatively large; shoulder girdle with deep cross furrow near isthmus, above which there is a fleshy projection . . . . . *Selar crumenophthalmus*  
Lateral line strongly arched anteriorly; scales minute; shoulder girdle without deep cross furrow at its junction with the isthmus . . . . . 15
- 15 Cheek partly scaled; dorsal rays 18-19; anal rays 15-16; anus about midway between pelvic base and first anal spine; scutes with moderately developed spinous points; gill rakers on lower limb or arch 14-16 . . . . .  
*Alectis crinitus*  
Cheek naked; dorsal rays 20-23; anal rays 17-20; anus near pelvic fin; scutes without spinous points; gill rakers 23-29 . . . . . *Vomer setapinnis*
- 16 Vomerine teeth absent; outer teeth not enlarged; caudal peduncle without keels; depth 2.0-2.5; greatest width of maxillary less than diameter of pupil; dorsal spines usually 7; pelvic fins reaching less than half distance from pelvic base to origin of soft anal . . . . . *Hemicaranx amblyrhynchus*  
Vomerine teeth present; outer teeth in jaw moderately enlarged; two short keels on caudal peduncle (not in small specimens); depth 2.8-3.3 (in larger specimens); dorsal spines usually 8; pelvic fins reaching approximately half distance from pelvic base to origin of soft anal . . . . . 17
- 17 Anal rays 15-17; dorsal rays 19-22; maxillary extending to posterior margin of eye . . . . . 18  
Anal rays 19-24; dorsal rays 23-27; maxillary extending at most to middle of eye . . . . . 19
- 18 Chest with scales . . . . . *Caranx latus*  
Chest without scales . . . . . *Caranx hippos*
- 19 Lateral scutes 20-31; dorsal rays 25-27; anal rays 22-24; chord of curve in lateral line somewhat shorter than straight part of lateral line; body rather deep . . . . . *Caranx bartholomaei*  
Lateral scutes 45-54; dorsal rays 23-24; anal rays 19-21; chord of curve in lateral line about 1.7 times into length of straight part; body rather slender. . . . . *Caranx crysos*

**CORYPHAENIDAE** . . . . . *Coryphaena hippurus*

**LUTJANIDAE**

- 1 Interorbital area flat; maxillary at least as long as distance between posterior margin of orbit and posterior tip of opercle . . . . . *Pristipomoides aquilonaris*  
Interorbital area convex; maxillary shorter than distance between posterior margin of orbit and posterior tip of opercle. . . . . 2
- 2 Dorsal spines 12, rarely 13; base of spinous dorsal at least as long as distance from tip of snout to insertion of pectoral fin. . . . . *Rhomboplites aurorubens*  
Dorsal spines 10; base of spinous dorsal shorter than distance from tip of snout to insertion of pectoral fin . . . . . 3

- 3 Scales in lateral series 40-48, usually 41-47; 2 or 3 rows of scales above opercle; lower jaw not projecting beyond upper jaw; accessory lateral lines not present on upper half of caudal fin, rarely present on lower half; no lateral spot; coloration in life not predominantly red. . . . . 4
- Scales in lateral series 45-54, usually 47-51; 4-7 rows of scales above opercle; lower jaw projecting beyond upper jaw; accessory lateral lines present on caudal fin; lateral spot present or absent; coloration in life predominantly red. . . . . 5
- 4 Scales in lateral series 40-44, usually 41-43; scales above lateral line 5-7, usually 6; cheek scale rows 6-8, usually 7; opercular scale rows 6-8, usually 7; largest anterior canine in lower jaw is smaller than largest midlateral canine; coloration in life predominantly yellow. . . . . *Lutjanus apodus*
- Scales in lateral series 44-48, usually 45-47; scales above lateral line 7-11, usually 8-10; cheek scale rows 7-10, usually 8-9; opercular scale rows 8-10, usually 9; largest anterior canine in lower jaw is at least equal to largest midlateral canine; coloration in life not predominantly yellow. . . . . *Lutjanus griseus*
- 5 Dorsal rays 12, rarely 13; two vertical rows of scales between posterior margin of orbit and upper end of preopercular margin; lower jaw strongly projecting beyond upper; lateral spot present . . . . . *Lutjanus synagris*
- Dorsal rays 14, rarely 13; 3 or 4 vertical rows of scales between posterior margin of orbit and upper end of preopercular margin; lower jaw slightly projecting beyond upper; lateral spot present or absent . . . . . 6
- 6 Pectoral rays 15-17, usually 16; gill rakers on lower limb of first arch (excluding rudiments) 7-8; only one developed gill raker on upper limb of first arch; no teeth on tongue; vomerine teeth in a crescent-shaped patch, without distinct median posterior extension; suborbital width 10-12% of standard length; lateral spot persistent in adults, not larger than pupil of eye . . . . . *Lutjanus analis*
- Pectoral rays 16-18, usually 17; gill rakers on lower limb of first arch (excluding rudiments) 8-13, usually 9-11; 1-3 (usually 2) developed gill rakers on upper limb of first arch; teeth present on tongue; vomerine teeth in an anchor-shaped patch, with distinct median posterior extension; suborbital width 6-9% of standard length; lateral spot present in young, diffuse or absent in adults, larger than pupil . . . . . 7
- 7 Scales in lateral series 46-50, usually 47-49; scales above lateral line 7-10, usually 8-9; scales below lateral line 15-18, usually 16-17; anal rays 9, rarely 8; scales on anterior body below lateral line much larger than those on posterior body; suborbital width 8-9% of standard length . . . . . *Lutjanus campechanus*
- Scales in lateral series 49-53, usually 50-52; scales above lateral line 10-12, usually 11-12; scales below lateral line 20-24, usually 21-23; anal rays 8-9, usually 8; scales on anterior body below lateral line equal to those on posterior body; suborbital width 6-7% of standard length . . . . . *Lutjanus vivanus*

**LOBOTIDAE** . . . . . *Lobotes surinamensis*

#### **GERREIDAE**

- 1 Premaxillary groove scaled in front, the scales leaving a naked pit behind; body usually rather deep, the depth 2.4 in standard length; interhaemal bone of second anal spine curved, its anterior end wide and not greatly constricting posterior end of air bladder. . . . . *Eucinostomus gula*
- Premaxillary groove completely naked, without scales; body more elongate, depth 2.6-3.1 in standard length; interhaemal bone of second anal spine not curved, its anterior end narrow and greatly constricting posterior end of air bladder . . . . . *Eucinostomus argenteus*

#### **POMADASYIDAE**

- 1 Mouth not relatively large, not scarlet within; soft dorsal and anal fins not densely scaled, but scaled only on basal parts . . . . . *Orthopristis chrysoptera*

- 1 Mouth relatively large, scarlet within; soft dorsal and anal fins densely scaled . . . . . 2
- 2 Dorsal spines 13 . . . . . *Haemulon aurolineatum*  
Dorsal spines 12, rarely 11. . . . . 3
- 3 Scales above anterior part of lateral line much larger than the other scales; anterior profile of head somewhat concave . . . . . *Haemulon plumieri*  
Scales above anterior part of lateral line not much larger than the other scales; anterior profile of head more or less straight . . . . . *Haemulon sciurus*

#### SPARIDAE

- 1 Front teeth conical or canine-like . . . . . 2  
Front teeth compressed, incisor-like . . . . . 3
- 2 Scales small, 9-58-16; body much elevated; scales on cheek in 7-8 series; outer canines of upper jaw directed horizontally forward (except in very young); longest dorsal spine about 2.0 in head length . . . . . *Calamus proridens*  
Scales larger, 6-48-13; body little elevated; scales on cheek in 4-5 series; canines not directed horizontally forward; longest dorsal spine about 2.5 in head length . . . . . *Calamus arctifrons*
- 3 Incisors narrow, lanceolate; temporal crest rudimentary; molars in 2 rows in each jaw; third dorsal spine longer than head . . . . . *Stenotomus caprinus*  
Incisors broad; temporal crest not obsolete; molars in 2-3 rows in each jaw; third dorsal spine shorter than head . . . . . 4
- 4 Incisors conspicuously notched; scales in lateral series 65-70; upper molars in 2 rows . . . *Lagodon rhomboides*  
Incisors entire or with shallow notch; scales in lateral series 48-56; upper molars in 3 rows . . . . . 5
- 5 Incisors truncate, entire; total upper incisors 8; about 56 scales in lateral series; dorsal rays 14-15; anal rays 13; third dorsal spine less than half head length. . . . . *Diplodus holbrooki*  
Incisors entire or with shallow notch, serrate in young; total upper incisors 6; about 48 scales in lateral series; dorsal rays 10-12; anal rays 10-11; third dorsal spine more than half head length . . . . . *Archosargus probatocephalus*

#### SCIAENIDAE

- 1 Dorsal spines well separated; dorsal rays 20-32 . . . . . 2  
Dorsal spines close together; dorsal rays 36-58 . . . . . 14
- 2 No barbels on mandible . . . . . 3  
One or more barbels on lower jaw (may be minute or well developed) . . . . . 10
- 3 Jaws with canine teeth anteriorly; scales small and deciduous; flesh soft . . . . . 4  
No canines in jaw; scales not small and deciduous; flesh firm . . . . . 6

- 4 Posterior part of back, and dorsal and caudal fins with small dark dots; dorsal and anal fins without scales; lower limb of first gill arch with 8 gill rakers. . . . . *Cynoscion nebulosus*  
Posterior part of back, and dorsal and caudal fins without small dark dots; dorsal and anal fins with scales; lower limb of first gill arch with 9-12 rakers . . . . . 5
- 5 Anal rays usually 11-12; snout usually longer than least depth of caudal peduncle . . . . . *Cynoscion arenarius*  
Anal rays usually 9, sometimes 8; snout usually shorter than least depth of caudal peduncle . . . . . *Cynoscion nothus*
- 6 Suborbital bones with radiated appearance; skull bones very cavernous and spongy; caudal fin lanceolate . . . . . *Stellifer lanceolatus*  
Suborbital bones without conspicuous radiated appearance; skull bones not very cavernous; caudal fin not lanceolate, but truncate or emarginate. . . . . 7
- 7 No black spots on caudal peduncle; no black spot near upper angle of operculum . . . . . 8  
Black spot on shoulder, or one or more spots on caudal peduncle . . . . . 9
- 8 Preopercle serrate; mouth not greatly oblique; snout longer than diameter of eye . . . . . *Bairdiella chrysura*  
Preopercle not serrate; mouth greatly oblique, almost vertical; snout shorter than diameter of eye . . . . . *Larimus fasciatus*
- 9 One or more black spots on caudal peduncle; preopercle serrate in young, entire in adults. . . . . *Sciaenops ocellata*  
Black spot near upper angle of operculum; preopercle entire in young adults . . . . . *Leiostomus xanthurus*
- 10 Lower jaw with only one strong barbel (at symphysis); one anal spine . . . . . 11  
Lower jaw with many barbels; two anal spines . . . . . 13
- 11 Scales on breast much reduced; color silvery, without dusky bars or stripes; tip of spinous dorsal and upper part of caudal fin black; gill cavity pale in color . . . . . *Menticirrhus littoralis*  
Scales on breast not particularly reduced; dusky bars or stripes present; tip of spinous dorsal and upper part of caudal fin not black; gill cavity more or less dusky in color . . . . . 12
- 12 Spinous dorsal not reaching far beyond origin of soft dorsal; dusky bars not forming a V at nape . . . . . *Menticirrhus americanus*  
Spinous dorsal reaching far beyond origin of soft dorsal; last bar on nape meeting first one of body to form a distinct V. . . . . *Menticirrhus focaliger*
- 13 Preopercle serrate; lateral line scales 64-72 . . . . . *Micropogon undulatus*  
Preopercle not serrate; lateral line scales 41-45 . . . . . *Pogonias cromis*
- 14 Color dusky gray with at least traces of 7 longitudinal stripes . . . . . *Equetus acuminatus*  
Without longitudinal stripes; 3 bands (one vertically through eye, one diagonally from nape to pelvis, one curving from dorsal to caudal) . . . . . *Equetus lanceolatus*
- EPHIPPIDAE** . . . . . *Chaetodipterus faber*

## CHAETODONTIDAE

- 1 Preopercle armed at its angle with a very strong spine; dorsal spines 8-11; ground color black, the young with 5 vertical yellow bands . . . . . *Pomacanthus paru*  
Preopercle unarmed; dorsal spines usually 12-14; ground color not black . . . . . 2
- 2 Dark vertical band from soft dorsal to anal fin in adults (as well as in young); base of soft dorsal without black spot, but with dark band extending onto it. . . . . *Chaetodon sedentarius*  
Dark vertical band from soft dorsal to anal fin indistinct in adults (present in young up to 40 mm in length); base of soft dorsal with black spot . . . . . *Chaetodon ocellatus*

## POMACENTRIDAE

- 1 Teeth conical, in 2-4 series, the outer enlarged and somewhat blunt; preopercle entire; fins not uniformly black. . . . . *Chromis enchrysurus*  
Teeth more or less flattened, incisor-like, in 1-2 series; preopercle either entire or serrate; fins uniformly black or violet blue . . . . . 2
- 2 Preopercle sharply serrate; teeth entire; fins black . . . . . *Pomacentrus variabilis*  
Preopercle strictly entire; teeth emarginate or Y-shaped; fins violet blue. . . . . *Abudefduf saxatilis*

## LABRIDAE

- 1 Lateral line complete and continuous, dropping to a lower level on the caudal peduncle; profile anterior to eyes not nearly vertical; color in life not pink . . . . . *Halichoeres bivittatus*  
Lateral line interrupted posteriorly, beginning again at a lower level on the caudal peduncle; profile anterior to eyes nearly vertical; color in life pink. . . . . *Hemipteronotus novacula*

SCARIDAE . . . . . *Sparisoma rubripinne*

## MUGILIDAE

- 1 Soft dorsal and anal fins covered with small scales; head not wider than deep; sides of body without conspicuous longitudinal stripes; anal with total of 12 rays-plus-spines . . . . . *Mugil curema*  
Soft dorsal and anal fins not covered with small scales (sometimes a few on the anterior rays); head wider than deep; sides of body (in adults) with conspicuous longitudinal stripes; anal with total of 11 rays-plus-spines . . . . . *Mugil cephalus*

## SPHYRAENIDAE

- 1 Spinous dorsal fin inserted definitely posterior to base of pelvic fin; pectoral fin long, its tip reaching base of pelvic fin; tip of lower jaw not distinctly fleshy; lateral line scales less than 115. . . . . 2  
Spinous dorsal fin above or slightly anterior to base of pelvic fin; pectoral fin not long, its tip not nearly reaching base of pelvic fin; tip of lower jaw usually distinctly fleshy; lateral line scales more than 118. . . . . *Sphyraena borealis*
- 2 Scales small, 108-114 in lateral line; teeth pointed obliquely backward . . . . . *Sphyraena guachancho*  
Scales large, 75-87 in lateral line; teeth vertical, not pointing backward . . . . . *Sphyraena barracuda*

**POLYNEMIDAE** . . . . . *Polydactylus octonemus*

**DACTYLOSCOPIIDAE** . . . . . *Dactyloscopus tridigitatus*

**URANOSCOPIIDAE**

1 Spinous dorsal present, with 3-5 spines; long, narrow Y-shaped bony process on head between and posterior to eyes; pectoral rays 19-22 . . . . . *Astroscopus y-graecum*

Spinous dorsal fin not present . . . . . 2

2 Lower jaw with pair of prominent converging bony ridges on anterior part, deeply notched between; long, flattened wing-like appendages at lower edge of opercle, without true spines; embedded scales present on body (easily seen in specimens of 100 mm and greater length); cleithral spine flat and blunt; pectoral rays 20-24 . . . . . *Gnathagnus egregius*

Lower jaw without pair of prominent converging bony ridges on anterior part; no wing-like appendages on preopercle, but its ventral margin with three spines; body without scales; cleithral spine long, sharply pointed, pectoral rays 14-16 . . . . . *Kathetostoma albiguttum*

**BLENNIIDAE**

1 Mouth small, the maxillary extending posteriorly scarcely beyond front of eye; head profile curved; pectoral rays usually 14; interorbital region concave; anterior lateral line pores in a series, paired dorsally and ventrally . . . . . 2

Mouth large, the maxillary extending posteriorly to beyond middle of eye; head profile rather pointed; pectoral rays usually 11-12; interorbital region flat; anterior lateral line pores in a series, not paired dorsally and ventrally. . . . . 3

2 Orbital cirrus simple, large or small; head more than 3.5 in standard length; upper lip thick; light bar behind and below eye usually conspicuous; first anal spine of breeding male lanceolate . . . . . *Hypsoblennius ionthas*

Orbital cirrus forked at tip, long in males; head less than 3.5 in standard length; upper lip thin; light bar behind and below eye usually indistinct; first anal spine of breeding male shield-shaped, broader than long . . . . . *Hypsoblennius hentzi*

3 Maxillary reaching posteriorly at most only slightly beyond posterior border of eye; teeth robust, bluntly rounded, and only slightly recurved, if at all . . . . . *Chasmodes saburrae*

Maxillary reaching well beyond posterior border of eye; teeth slender, quite pointed, and usually strongly recurved . . . . . *Chasmodes bosquianus*

**ELEOTRIDAE**

1 Dorsal spines 7; pectoral rays 14; less than 45 scales in lateral series; preopercle without spine; body robust, not elongate . . . . . *Dormitator maculatus*

Dorsal spines 6; pectoral rays 17; more than 50 scales in lateral series; preopercle with spine; body more or less elongate . . . . . 2

2 Second dorsal fin with 9 rays; pectoral fin reaching at least to origin of second dorsal fin; scales on posterior part of body are ctenoid; fewer than 75 scales in lateral series; caudal fin continues forward a short distance onto caudal peduncle; body less elongate . . . . . *Eleotris pisonis*

- 2 Second dorsal fin with 12 rays; pectoral fin not reaching beyond origin of second dorsal fin; scales cycloid; about 100 scales in lateral series; caudal fin continues forward a great distance onto caudal peduncle; body slender. . . . . *Erotelis smaragdus*

## GOBIIDAE

- 1 Dorsal fin continuous; body very slender, the depth not more than 10% of standard length; eye about 9% of head length; scales cycloid; a series of 25 or more chevron shaped dark markings on sides of body. . . . . *Gobioides broussoneti*  
Dorsal fins separate; body less slender to robust, the depth more than 10% of standard length; eye about 15% of head length; if scales are present, some of them are ctenoid; no long series of dark markings on sides of body. . . . . 2
- 2 Upper pectoral rays free for most of their length; tongue notched in front . . . . . *Bathygobius soporator*  
Pectoral rays united for most of their length; tongue may be emarginate, but the notch is poorly developed . . . . 3
- 3 Body more or less completely scaled . . . . . 4  
Body more or less completely naked . . . . . 10
- 4 Mouth inferior; anterior upper jaw teeth in one row . . . . . *Evorthodus lyricus*  
Mouth terminal or inclined; anterior upper jaw teeth in more than one row . . . . . 5
- 5 Dorsal spines 7; pectoral rays more than 20 . . . . . 6  
Dorsal spines 6; pectoral rays less than 20 . . . . . 8
- 6 Cheek, opercle, and chest scaled or with obvious scale pockets; scales deciduous, about 30 in lateral series; dorsal rays 14 . . . . . *Bollmannia communis*  
Cheek, opercle, and chest naked; scales adherent, more than 40 in lateral series; dorsal rays 16 . . . . . 7
- 7 Body with large dark blotches; mouth moderately inclined; outer teeth much enlarged, somewhat canine-like. . . . . *Microgobius gulosus*  
Body without prominent dark blotches; mouth strongly inclined; outer teeth only slightly enlarged, not canine-like . . . . . *Microgobius thalassinus*
- 8 Scales more than 72 in lateral series; length of pelvic disc less than 20% of standard length; dorsal rays 14; anal rays 15 . . . . . *Gobionellus hastatus*  
Scales in lateral series less than 41; length of pelvic disc more than 20% of standard length; dorsal rays less than 14; anal rays less than 15 . . . . . 9
- 9 Dorsal rays 12; anal rays 13; pectoral rays 17; scales in lateral series more than 34; midline anterior to dorsal fin usually crossed by one or more rows of scales in larger specimens . . . . . *Gobionellus shufeldti*  
Dorsal rays 11; anal rays 12; pectoral rays 16; scales in lateral series less than 34; midline anterior to dorsal fin usually naked, occasionally with one or more solitary scales . . . . . *Gobionellus boleosoma*
- 10 Two ctenoid scales on each side of base of caudal fin; spaces between vertical lateral dark bars (if present) are wide. . . . . *Gobiosoma longipala*  
Completely naked, without scales or scale pockets on base of caudal fin; spaces between vertical dark bars (if present) are narrow . . . . . 11



11 Dorsal rays 12; anal rays 10; pectoral rays 17; depth about 19% of standard length; pelvic disc reaches posteriorly at least to anus . . . . . *Gobiosoma robustum*

Dorsal rays 13; anal rays 11; pectoral rays 18; depth about 16% of standard length; pelvic disc does not reach posteriorly to anus . . . . . *Gobiosoma hosi*

**MICRODESMIDAE** . . . . . *Microdesmus longipinnis*

**TRICHIURIDAE** . . . . . *Trichiurus lepturus*

#### **SCOMBRIDAE**

1 Caudal peduncle without median lateral keel; pectoral fins inserted high, on level with eye . . . . . *Scomber japonicus*

Caudal peduncle with median lateral keel, and a small keel above and below this one; pectoral fin usually inserted below level of eye . . . . . 2

2 Dorsal spines about 25; gill laminae forming a network; tooth margins serrate; gill rakers absent . . . . . *Acanthocybium solanderi*

Dorsal spines 10-16; gill laminae not forming a network, but normal; tooth margins smooth; gill rakers present . . . . . 3

3 Body without scales, except about lateral line and the corselet . . . . . *Euthynnus alletteratus*

Body completely covered with scales, those of the corselet and lateral line sometimes larger . . . . . 4

4 Maxillary reaching posteriorly to or past posterior margin of orbit; corselet distinct; oblique, dark stripes on back running upward and backward . . . . . *Sarda sarda*

Maxillary not reaching posteriorly to posterior margin of orbit; corselet obscure; no oblique dark stripes . . . . . 5

5 Lateral line not abruptly decurved under second dorsal fin; dorsal spines 17-18; first dorsal fin black anteriorly; soft dorsal fin inserted anterior to anal fin; gill rakers 10-11 on lower limb of gill arch . . . . . *Scomberomorus maculatus*

Lateral line abruptly decurved under second dorsal fin; dorsal spines 15-16; first dorsal not black anteriorly, except in young; soft dorsal fin inserted over anal fin; gill rakers 7-9 on lower limb of gill arch . . . . . *Scomberomorus cavalla*

#### **STROMATEIDAE**

1 Dorsal and anal fins very high anteriorly, both falcate; body very deep, less than 1.5 in standard length; no row of pores on back above lateral line . . . . . *Peprilus alepidotus*

Dorsal and anal fins moderately high anteriorly, neither of them falcate; body less deep, more than 1.7 in standard length; a row of conspicuous pores on back above lateral line . . . . . *Peprilus burti*

#### **SCORPAENIDAE**

1 Length of supraocular tentacle more than twice diameter of eye; dorsal rays 9; suborbital stay with 2 small spines; axillary region dusky gray, with numerous small white stellate spots . . . . . *Scorpaena grandicornis*

Length of supraocular tentacle less than twice diameter of eye; dorsal rays 10; suborbital stay with 2-4 spines; axillary not as described above . . . . . 2

- 2 Anterior border of orbit with a distinct pit below it, between it and the suborbital stay; suborbital stay with 3-4 blunt spines; axillary region jet black, with a few large white spots. . . . . *Scorpaena plumieri*
- Anterior border of orbit without distinct pit below it; suborbital stay with 2-3 small spines; axillary region pale, with several round blackish spots . . . . . *Scorpaena brasiliensis*

# TRIGLIDAE

- 1 One or two dorsal spines greatly elevated, about half as long as body; head notably stout, massive and strongly armed; dorsal spines usually 11; dorsal rays 11-12 . . . . . *Bellator militaris*
- Dorsal spines comparatively low, not greatly elevated, with longest usually much shorter than head; dorsal spines usually 10; dorsal rays 12-13. . . . . 2
- 2 Posterior edge of pectoral emarginate, the middle rays shorter than those above and below . . . *Prionotus alatus*
- Posterior edge of pectoral moderately convex, or almost truncate transversely or obliquely, not emarginate . . . 3
- 3 Anal rays 11-13, usually 12; dorsal rays 12-14, usually 13 . . . . . 4
- Anal rays 10-12, usually 11; dorsal rays 11-13, usually 12 . . . . . 5
- 4 Attached pectoral rays 13-15, usually 14; chest fully scaled . . . . . *Prionotus martis*
- Attached pectoral rays 12-14, usually 13; chest usually incompletely scaled, with a naked anterior area . . . . . *Prionotus scitulus*
- 5 Rostral, supplemental preopercular, and buccal spines absent in specimens over 30 mm (in *roseus*, the anterior rostral spine may persist to length of 165 mm); maximum size 225 mm . . . . . 6
- Two rostral, supplemental preopercular, and buccal spines present (buccal may disappear at different sizes, rostral and supplemental preopercular persist, at least as a trace) . . . . . 8
- 6 Pectoral short, not reaching past base of second anal ray; lateral scales (counted from base of first dorsal spine to base of caudal, counting vertical rows) 78-93 . . . . . *Prionotus stearnsi*
- Pectoral reaching at least to base of sixth anal ray; lateral scales 89-105 . . . . . 7
- 7 Attached pectoral rays 14; upper part of eye with stout tentacle; nostril with rather long filament; gill rakers on lower limb of arch 6-7; pectoral without blue spots . . . . . *Prionotus ophryas*
- Attached pectoral rays 12-14, usually 13; eye without tentacle; nostril without filament; gill rakers 8-10, rarely 7; pectoral usually with blue spots . . . . . *Prionotus roseus*
- 8 Lateral scales 68-90; interorbital space 7-10.5% of standard length; interorbital space equal to eye diameter or wider; head 40-47% of standard length; spines on head very well developed in small specimens, with expanded, shelf-like bases; head spines much reduced with growth . . . . . *Prionotus tribulus*
- Scales 88-115; interorbital space 4-6% of standard length, less than eye diameter; head 35-43% of standard length; spines on head rather moderately developed . . . . . 9
- 9 Longest caudal lobe 29-36% of standard length; pectoral 40-56% of standard length; pelvic 26-31% of standard length; posterior margin of pectoral slightly rounded or truncate; pectoral reaching at least to base of fifth anal ray, and may reach a little behind anal base; scales 88-106; spinous dorsal spot persistent . . . . . *Prionotus rubio*

- 9 Caudal 24-31% of standard length; pectoral 55-72% of standard length; pelvic 29-34% of standard length; posterior margin of pectoral obliquely truncate; pectoral reaching at least to base of ninth anal ray, and may reach a little beyond caudal base; scales 103-115; spinous dorsal spot in young, disappearing with growth . . . . . *Prionotus salmonicolor*

## ORDER PLEURONECTIFORMES

- 1 Eyes on right side . . . . . *Soleidae* (Page 30)  
 Eyes on left side . . . . . 2
- 2 Margin of opercle free, not covered with skin and scales; median fins not continuous; lateral line present . . . . .  
*Bothidae* (Page 29)  
 Margin of opercle not free, but covered with skin and scales; median fins continuous; lateral line absent . . . . .  
*Cynoglossidae* (Page 30)

## BOTHIDAE

- 1 Large round spots on dorsal, caudal, and anal fins; a large dark blotch under pectoral fin on ocular side . . . . .  
*Cyclopsetta fimbriata*  
 No large round spots on dorsal, caudal, or anal fins; no blotch under pectoral fin. . . . . 2
- 2 Lateral line with distinct curve anteriorly . . . . . 3  
 Lateral line without distinct curve anteriorly . . . . . 8
- 3 Four large, prominent ocellated spots, the anteriormost spot over the arch of the lateral line . . . . .  
*Ancylopsetta quadrocellata*  
 No ocellated spot over the arch of the lateral line . . . . . 4
- 4 Three large ocellated spots present . . . . . 5  
 No large ocellated spots present . . . . . 6
- 5 Some anterior dorsal rays elongate; pelvic fin on ocular side definitely longer than that of blind side; the posterior spot is at base of caudal peduncle . . . . . *Ancylopsetta dilecta*  
 Anterior dorsal rays not elongate; pelvic fins more or less equal in length; posterior spot anterior to base of caudal peduncle . . . . . *Paralichthys albigutta*
- 6 Lateral line absent or poorly developed on blind side; lateral line scales 63-68; upper jaw length 41% of head length . . . . . *Trichopsetta ventralis*  
 Lateral line equally well developed on both sides; lateral line scales at least 85; upper jaw length at least 47% of head length . . . . . 7
- 7 Body depth greater than 47% of standard length (mean 50%); blind side on larger specimens dusky; lateral line scales 104-117. . . . . *Paralichthys squamilentus*  
 Body depth 47% or less of standard length (mean 44%); blind side immaculate or dusky; lateral line scales 85-100 . . . . . *Paralichthys lethostigma*
- 8 Mouth small, maxillary 3.5-4.2 in head length; maxillary extending posteriorly to anterior edge of lower eye; body depth 50-58% standard length . . . . . *Etropus crossotus*

- 8 Mouth moderate to large, maxillary 1.7-3.3 in head length; maxillary extending posteriorly at least to middle of lower eye . . . . . 9
- 9 Jaws without distinct canine teeth anteriorly; gill rakers on lower limb of gill arch long and slender, 9-16 . . . . . 10  
 Jaws with some canine teeth anteriorly; gill rakers moderately long and thick, or short and stout, but not slender, 6-9 on lower limb of gill arch . . . . . 11
- 10 Body and median fins profusely covered with regularly arranged dark spots and blotches (scales deciduous, spotting on body not obvious when scales are lost); eye large, about 4.0 in head length. . . . .  
*Citharichthys macrops*  
 Body and median fins not profusely covered with regularly arranged dark spots and blotches; eye small, about 6.0-8.0 in head length. . . . . *Citharichthys spilopterus*
- 11 Body depth 48-55% of standard length; dorsal rays 74-85; lateral line scales 46-55; anal rays 59-68. . . . .  
*Syacium gunteri*  
 Body depth 40-47% of standard length; dorsal rays 82-94; lateral line scales 47-60; anal rays 64-75. . . . .  
*Syacium papillosum*

#### SOLEIDAE

- 1 Scales absent . . . . . *Gymnachirus texae*  
 Scales well developed . . . . . 2
- 2 Pectoral fins small but present on right side only; body cirri present, often in patches; 75-85 lateral line scales . . . . . *Achirus lineatus*  
 Pectoral fins absent; body cirri usually present, never in patches; 66-75 lateral line scales . . . . .  
*Trinectes maculatus*

#### CYNOGLOSSIDAE

- 1 Caudal rays 9-11 (usually 10); usually a black spot on head . . . . . *Symphurus plagiusa*  
 Caudal rays 11-12 (usually 12); never a black spot on head . . . . . *Symphurus civitatus*

#### ORDER TETRAODONTIFORMES

- 1 Jaws with distinct, separate teeth . . . . . 2  
 Jaws without distinct, separate teeth, each jaw being modified into a kind of beak. . . . . 3
- 2 Spinous dorsal present; body with scales or movable plates . . . . . **Balistidae** (Page 31)  
 Spinous dorsal absent; body enclosed in immovable shell formed of hexagonal plates. . . . . **Ostraciidae** (Page 31)
- 3 Upper and lower jaws each divided by median sutures; skin without scales, more or less prickly . . . . .  
**Tetraodontidae** (Page 31)  
 Upper and lower jaws each not divided by median sutures; skin with stout, rooted spines  
**Diodontidae** (Page 31)

## BALISTIDAE

- 1 First dorsal of three spines, the first large, and the second locking it into erect position; scales rather large, bony, and rough ..... *Balistes capricus*  
First dorsal of one spine; scales minute, not bony, their edges rough, so that the skin has a rough velvety texture ..... 2
- 2 Pelvic bone with small spine at its end; gill opening short, nearly vertical; less than 35 rays in either dorsal or anal fin ..... *Monacanthus hispidus*  
Pelvic bone without spine at its end; gill opening long, oblique; more than 35 rays in either dorsal or anal fin ..... 3
- 3 Dorsal rays more than 42; anal rays more than 45 ..... *Aluterus scriptus*  
Dorsal rays less than 40; anal rays less than 42 ..... *Aluterus schoepfi*

## OSTRACIIDAE

- 1 A well developed spine over each eye, pointing forward ..... *Lactophrys quadricornis*  
No spine over either eye ..... *Lactophrys trigonus*

## TETRAODONTIDAE

- 1 Dorsal and anal fins rather long, falcate, each with 12-15 rays; caudal fin lunate; nostrils not tubular; very conspicuous mucus tubes on upper part of head and sides of body; lower side of tail with a fold; skin with prickles best developed on under side of body. .... *Lagocephalus laevis*  
Dorsal and anal fins rather short, rounded, each with 6-8 rays; caudal fin rounded; nostrils tubular; mucus tubes not conspicuous; lower side of tail without fold; skin with prickles not confined to under side of body or else without prickles ..... 2
- 2 Skin of body mostly smooth; sides usually with small dermal scale-like flaps, especially in young; 12-13 roundish dark spots in ventrolateral row from chin to caudal fin ..... *Sphoeroides spengleri*  
Skin of body mostly with prickles; sides without dermal flaps; dark spots not forming any definite pattern ..... *Sphoeroides parvus*

## DIODONTIDAE ..... *Chilomycterus schoepfi*

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